UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
BIN C15700
Seattle, WA 98115-0070

November 25, 2002

Daniel Mathis
Federal Highways Administration
Suite 501 Evergreen Plaza
711 South Capitol Way
Olympia, Washington 98501-1284

Re: Endangered Species Act Section 7 Formal Consultation and Magnuson-Stevens Act Essential Fish Habitat Consultation for Donald Wapato Road Bridge Replacement Project, Yakima County, Washington (WHB-02-002)

Dear Mr. Mathis:

Enclosed is the National Marine Fisheries Service's (NMFS) biological opinion (Opinion) concluding formal Endangered Species Act consultation on the Donald Wapato Road Bridge Replacement Project, Yakima County, Washington as described in Yakima County's biological assessment (BA) dated November 2001. This Opinion addresses Middle Columbia River steelhead (*Onchorynchus mykiss*).

The NMFS has determined that the proposed action is not likely to jeopardize the continued existence of the listed species described above. An Incidental Take Statement provides non-discretionary terms and conditions to minimize the potential for incidental take of listed species.

In addition, this document also serves as consultation on Essential Fish Habitat for chinook (*Oncorhynchus tshawytscha*) and coho (*O. kisutch*) salmon under the Magnuson-Stevens Act and its implementing regulations (50 C.F.R. Part 600).

We appreciate the considerable effort and cooperation provided by your staff in completing this consultation. If you have any questions regarding this Opinion, please contact Bill Leonard at (360) 753-9887 of my staff in the Washington State Branch Office.

Sincerely,

For Michael R Crouse

D. Robert Lohn
Regional Administrator

Enclosure

cc: Gene Soules, Yakima County Public Works
Michael A. Kulbacki, FHWA
Paul Ward, Yakama Indian Nation

Endangered Species Act – Section 7 Consultation
Biological Opinion
&
Magnuson–Stevens Fishery Conservation & Management Act
Essential Fish Habitat Consultation

Donald Wapato Road Bridge Replacement Project, Yakima County, Washington
WHB-02-002

Agency: Federal Highway Administration

Consultation Conducted By: National Marine Fisheries Service,
Northwest Region

Issued by: For Michael R Crouse Date: November 25, 2002

D. Robert Lohn
Regional Administrator

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1.0 INTRODUCTION

This document transmits the National Marine Fisheries Service's (NOAA [National Oceanic and Atmospheric Administration] Fisheries) Biological Opinion (Opinion) and Essential Fish Habitat (EFH) consultation based on our review of a project to replace the Donald Wapato Bridge in Yakima County, Washington. The Donald Wapato Road Bridge crosses the Yakima River, which is a tributary to the Columbia River. The Yakima River is located in the Mid-Columbia River (MCR) evolutionary significant unit (ESU) and is EFH for chinook (*Oncorhynchus tshawytscha*) and coho (*O. kisutch*) salmon.

1.1 Background Information & Consultation History

The Federal Highway Administration (FHWA) concluded that the project proposed by the lead agency, Yakima County Public Works Department, was likely to adversely affect MCR steelhead (*O. mykiss*). The Donald Wapato Road Bridge is located approximately 1.5 miles northeast of Wapato, WA and is a major rural collector that provides connectivity between the cities of Donald to the north and Wapato to the south. Donald Wapato Road crosses the Yakima River using three existing bridges numbered 395, 396, and 397 (from south to north). These bridges are structurally deficient, functionally obsolete, and load restricted. In addition, the bridges do not meet current design standards and contribute to safety problems. The proposed replacement will upgrade the bridges to county highway standards and structural capacity.

This document is based on information provided in the Biological Assessment (BA), a BA addendum, and information contained in two letters (dated April 3, 2002 and August 8, 2002), from FHWA to NOAA Fisheries. Formal consultation was initiated on August 12, 2002.

1.2 Description of the Proposed Action

The FHWA proposes to fund, in whole or in part, a construction project to be constructed by Yakima County. The Yakima County Public Works Department proposes to replace the Donald Wapato Road overcrossing of the Yakima River in Yakima, Washington. The three existing 31-foot wide concrete bridges will be demolished and replaced by two 440-foot long by 40-foot wide concrete superstructure bridge up to 140 feet downstream of, and parallel to, the existing bridge. The length of the realigned road/bridge segment is 3,300 feet.

1.2.1 Clearing and Grading

Following installation of temporary erosion and sediment control measures, upland work will commence, including clearing and grubbing, grading, and stabilization of the access road with quarry spalls. The area covered by the permanent facilities (*i.e.*, relocated road bridge piers, stormwater ponds) associated with the Donald Wapato Road crossing of the Yakima River is approximately 1.5 acres. Included within the 1.5-acre clearing/grading area is 0.12 acre of scrub-shrub wetland that will be filled to accommodate a driveway to the wrecking yard. An additional 3.2 acres will be temporarily disturbed by project construction (*e.g.*, staging areas). Up to 40 black cottonwood trees larger than eight inches in diameter will be removed from the riparian zone of the Yakima River.

1.1.2 Construction of the Temporary Work Bridges

Two 25 to 30 foot wide temporary work bridges will be built just downstream of the proposed locations for Bridges 395 and 396. The work bridges will be approximately 700 feet long and will span both channels of the Yakima River. Finger piers will be built adjacent to the drilled shaft locations to provide access for shaft construction, and “wideouts” (*i.e.*, wider sections of the work bridge) will be constructed opposite each finger pier to allow equipment to sit nearby without obstructing construction activity on the bridge. Construction of the temporary work bridges will take approximately four weeks and will occur during the in-water work window in 2003. The work bridges will be built on approximately 120 to 150 two-foot diameter steel piles. Temporary approach embankments will be placed in shoreline areas and between the work bridges to provide access to equipment and workers. Work bridge construction will begin on one side of the river by driving piles into place using a pile-driving hammer mounted on a boom crane. After piles are set for a pier, the contractor will install timber bents and place a section of deck. The pile-driving hammer will then be moved forward on the bridge deck to drive piles for the next pier. This will be repeated until the work bridges span the Yakima River. The work bridges will remain in place over the winter of 2003 and will be removed during the in-water work period of 2004.

1.2.3 Construction of the New Bridges

1.2.3.1 Shaft Foundations

In-water drilled shaft construction will be done from the finger piers of the work bridges. Steel cylinders about 11 feet in diameter will be placed at the shaft locations to act as cofferdams. A concrete seal may be placed at the shaft locations to limit water intrusion. The eight-foot diameter shaft casing will be placed within the cofferdam and progressively vibrated or rotated through the seal and into the substrate. As the casing descends, a clamshell or auger will remove the spoils from within the casing and place them in trucks on the work bridge. Additional casings will be added as the depth of the shaft increases. When the final depth has been reached, a large rebar reinforcing cage will be placed in the excavated shaft and concrete will be pumped into the bottom of the shaft. As concrete fills the shaft, the casing will be progressively removed and purged water from the shaft will be collected and discharged to one of the lined, temporary sedimentation ponds. The bridge columns, crossbeams, and abutments will then be formed and poured on the foundation shafts. Cofferdams will remain in place until the in-water work period in 2004, at which time they will be cut and removed.

1.2.3.2 Superstructure

Once the shafts, columns, and other substructure elements are completed, girders will be placed and the bridge deck, approach slabs, and traffic barriers will be poured. Bridge approaches will be backfilled and stabilized, and drainage conveyances will be completed. Final steps will include asphalt paving, guardrail placement, and striping the roadway. Since these activities do not involve in-water work, they will continue outside the in-water work period. No riprap will be placed below the ordinary-high-water mark (OHWM) of the Yakima River. However, riprap will be used to stabilize portions of the road embankment up to the 100-year flood elevation.

1.2.3.3 Approach Roads, Driveways & Access Roads

New road embankments will be provided to connect the existing Donald Wapato Road to the new bridges at each end of the project and between the two bridges. The length of the new approach roads on embankment will be approximately 2,400 feet. The required quantity of fill is estimated to be approximately 38,500 cubic yards. An access driveway will be provided from the new alignment to the auto salvage yard. The driveway will be built on the embankment and will result in the filling of 0.12 acre of scrub-shrub wetland. Existing driveways to the Washington Department of Fish and Wildlife (WDFW) parking lot and other properties will be modified as needed to reconnect them to the revised grade of the Donald Wapato Road.

1.2.4 Work-area Isolation & Fish Removal

During the construction of drilled shafts, the excavation activities and concrete pours will be isolated from flowing water by cylindrical cofferdams that will effectively isolate the work area from the water. While activities leading up to the placement are likely to scare fish out of the area, there is a potential to trap fish inside during placement of the cylinders. If fish are observed within the cofferdam prior to dewatering, they will be netted and placed outside the dewatered area. As dewatering progresses, visual inspections will be made for captured fish. If any are present, the fish will be netted and removed.

Demolition of over-water bridge spans will be preceded by efforts to exclude fish from the immediate splash area. In backwater areas and slow velocity areas, such as the northern span of Bridges 395 and 396, silt curtains will be installed. A pair of seine nets will be moved progressively away from the centerline below the bridge to exclude fish. The sweep will be duplicated and silt curtains will be installed inside the area swept using the netting. The silt curtains will be anchored on the bottom and with floats at the surface to discourage re-entry of fish into the exclusion zone.

Where water velocity would render a silt curtain ineffective, other measures will be employed. For example, under the center span of Bridge 395, water will be diverted from the main channel to the left bank channel by using a rubber diversion dam at the upstream end of the island. Staff will be deployed during the diversion to watch for fish strandings and to encourage fish to move downstream out of the demolition area. As the diversion upstream of the island is removed, staff will be deployed along the east channel to assist fish from becoming stranded.

1.2.5 Demolition of the Existing Bridges

The demolition of the existing bridges will take place between July 15 and September 30, 2004. Demolition activities will occur three general steps: 1) scuttle preparation work, 2) approach embankment removal, and 3) scuttle work.

Each concrete bridge will need to be prepared for the scuttle operations. The existing asphalt overlay on each bridge will be ground down to the concrete deck surface and disposed of off site. Bridge rail overhangs will be sawcut off at the face of the box girder structures to minimize the weight of each structure. The top slab within the central cell of bridge 395 also will be sawcut and removed. Methods to keep concrete dust from entering the river will likely include wet-cutting, with collected debris routed to a water-quality-treatment system before entering the river. Sawcut scoring will be used where feasible. Sawcut scoring consists of cutting the top of the slab to within one-half inch of the bottom surface to permit all of the debris to be removed without a discharge to the river.

The approach embankment between existing Bridges 395 and 396 likely will be removed before the scuttle operation begins. Prior to the embankment being removed, the island access road located between new Bridges 395 and 396 will be constructed. This new access road will be used to haul demolition debris from the site. The approach embankment between existing Bridges 396 and 397 likely will be removed when the scuttle operation begins so that this area can be utilized as a staging area for the removal of the north span of existing Bridge 396. The approach embankment south of existing Bridge 395 will be needed as a haul road for removing the debris from the two southerly spans of existing Bridge 395.

A single cell of an entire span between support piers will be individually weakened at the face of the piers to allow an entire span to drop in one continuous segment. Explosives will be used to cause an immediate weakening, which, in turn, will drop the span. The charges are used only to sever the ends of each designated span, not to blow it apart. Each designated charge lasts no more than a few seconds, resulting from many small demolition charges at critical locations on the structure. The noise from the explosion and subsequent impact of the bridge landing in the river will last a few seconds. The potential shock of the bridge spans landing in the river will be cushioned by logs placed in the landing area. The logs would float before a span is dropped and provide a system of rollers for the span to move atop. Two actions likely will be taken to control a dropped bridge span from drifting in water currents. First, the span will be tethered to the far span pier and anchored to a lift-and-pull system on shore. The lift-and-pull system will likely consist of a crane and a tractor. Next, the river channel upstream will be diverted temporarily to the adjacent channel using an inflatable waterfall. This likely would consist of a system constructed of two polyethylene liners contained by a high-strength woven geotextile outer tube. When the two inner tubes are filled with water, the resulting pressure and mass create a stable, non-rolling wall of water. The intent would not be to drain the river channel, but to still its flow.

1.2.5.1 Existing Bridge 395

Demolition of existing Bridge 395 will likely occur first. The steps mentioned above will be followed. The demolition sites will be located on the shorelines west of new Bridge 395. Demolition will begin by removing the spans from east to west, and from south to north.

The southerly span is not located over water during normal flow conditions. Consequently, it is unlikely that a stream diversion will be necessary. The dropped span will be demolished in place or shuttled over to south shore demolition site. The span will be broken up into small pieces and hauled away for disposal. Equipment used for debris removal will include the following: crane with clamshell, dump trucks, front-end loader, and a trackhoe. The middle span is located over one of the main river channels. Temporary diversion of the river for this span will be necessary during demolition. The dropped span will be transported to the demolition site on the south shore where it will be broken up into small pieces to be hauled away for disposal. The northerly span also is located over one of the main river channels.

Temporary diversion of the river will be necessary. The dropped span will be transported to the demolition site on the north shore where it will be broken up into small pieces to be hauled away for disposal.

The abutments will be broken down into pieces that can be hauled away for disposal. During removal, the abutments will be taken down to one foot below the lesser of the existing or finished ground surface. Equipment used for debris removal will include concrete saws, crane with clamshell, dump trucks, front-end loader, and a trackhoe.

The two intermediate piers located in the river will be removed from inside cofferdams. The piers will likely be wire sawn into pieces that can be hauled to shore, and then broken into smaller pieces and hauled away for disposal. Piers will be taken down to one foot below the existing riverbed surface. Equipment used for debris removal will include to following: concrete saw, crane with clamshell, dump trucks, front-end loader, and a trackhoe.

1.2.5.2 Existing Bridge 396

Demolition of existing Bridge 396 will likely occur second. The steps mentioned above will be followed. The demolition sites will be located on the shorelines west of new Bridge 396. Demolition will begin by removing the spans from east to west, and from south to north. Temporary diversion of the river channel likely will not be necessary to remove this bridge because during normal, low-flow periods this channel is not open to flow.

The southerly span is not located over water during normal flow conditions. The dropped span will be demolished in place or shuttled over to the south shore demolition site. The span will be broken up into small pieces and hauled away for disposal. The middle span is located over a secondary river channel. The dropped span will be transported to the demolition site on the south shore where it will be broken up into small pieces to be hauled away for disposal. The northerly span also is located over a secondary river channel. Once dropped, the span will be transported to the demolition site on the north shore where it will be broken up into smaller pieces to be hauled away for disposal.

The abutments and the southerly intermediate pier that are to be removed will be broken down into pieces that can be hauled away for disposal. During removal, the abutments and southerly intermediate pier will be taken down to one foot below the lesser of the existing or finished ground surface.

The northerly intermediate pier located in the secondary river channel will be removed from inside a cofferdam. The pier will likely be wire sawn into large chunks that can be hauled to shore, then broken into smaller pieces and hauled away for disposal. At removal, the pier will be taken down to one foot below the existing riverbed surface.

1.2.5.3 Existing Bridge 397

Demolition of existing Bridge 397 will likely occur last, in sequence as described above. The demolition sites will be located within the footprint of the embankment removed from between existing Bridges 396 and 397. Explosives will not be necessary to remove this bridge.

Demolition will likely consist of sawcutting the existing concrete slab into longitudinal strips, then lifting the strips from east to west to the northern demolition site. The channel will be dry when the single span is scuttled. The concrete slab will be broken up into smaller pieces and hauled away for disposal.

The abutments will be broken down into pieces that can be hauled away for disposal. During removal, the abutments will be taken down to one foot below the lesser of the existing or finished ground surface.

1.2.5.4 Existing Railroad Piers

One of the existing railroad piers is located in the river and will be removed from inside a cofferdam. This pier likely will be wire sawn into large chunks that can be hauled to shore, and then broken down into smaller pieces to be hauled away for disposal. The pier will be taken down to one foot below the existing riverbed surface. The other pier is located on the main island and will be broken down into pieces that can be hauled away for disposal. During removal, the pier will be taken down to one foot below the existing ground surface.

1.2.6 Construction of Stormwater Facilities

As part of site preparation for construction of the new bridges, temporary sedimentation ponds will be built at the locations of the permanent infiltration ponds. These will be lined or only partially excavated. After construction, the accumulated sediments will be removed and the permanent stormwater facilities will be finished.

The project will result in a net increase of 1.9 acres of impervious surface. Stormwater will be collected from the bridges and approach road surfaces and conveyed to infiltration ponds located at each end of the project. The infiltration ponds will contain two cells each and will include an unpaved access driveway from the adjacent road for inspection and maintenance. The design provides for infiltration of the 100-year storm event.

1.2.7 Dike Removal & Site Restoration

1.2.7.1 Dike Removal

A dike located along the left (east) bank of the river channel upstream of the embankment between Bridge 396 and Bridge 397 will be removed to match the surrounding grade. The abandoned footprint will be planted with native woody trees and shrubs, approximately four foot on center. The dike is approximately 730 feet long and about 30 to 50 feet wide. Removing this dike will stop the artificial impoundment of water behind it, help restore natural velocities in the over-bank area, and aid in the river's reclaiming the left bank floodplain.

Prior to excavating the dike, the contractor will install a silt fence to mark the limits of the of excavation and disturbance. Excavation of the dike material will probably progress from the upstream end with access from the area of the excavated embankment between Bridges 396 and 397. To provide this access, a small backwater pool will have to be crossed. Alternatively, the dike excavation could be accessed via a small pioneer road from near the WDFW parking lot.

This option, however, may affect a greater amount of riparian vegetation that would have to be restored. Removal of this dike will eliminate the impounding of floodwaters behind it and, therefore, increase the velocity and conveyance through the left channel of the Yakima River.

1.2.7.2 Riparian Restoration

Riparian areas disturbed in association with embankment removal, dike removal, or general construction activities will be replanted once construction of the new bridges is completed. After the embankment and dike are removed, a ripper will be used to loosen the existing ground to a depth of 18 inches. The soil will then be cultivated to remove large clumps. If necessary, soil will be enhanced by adding high-carbon compost and soil micronutrients. Nutrient requirements will be determined by laboratory tests. Some areas of topsoil import may be required where the embankment and dike have been removed. Soil in the construction-impact areas will be amended as necessary with soil macronutrients and micronutrients.

A variety of shrubs and trees native to the action area will be planted in each restoration area. Vegetation will be selected and placed based on the local environmental conditions. Shrubs will be planted an average of six feet on center, and trees will be planted an average of 20 feet on center. Within the revegetation areas, shrubs will be planted in clusters four feet on center. Each cluster will contain three, seven, or 13 shrubs. Shrub clusters may contain more than one species. Approximately 1,500 shrubs and 130 trees will be planted in this area. Approximately 3.2 acres of disturbed areas will be planted in the areas of construction disturbance and embankment removal. Approximately 4,500 shrubs and 400 trees will be planted in these areas. Shrubs and trees will be bare root, containerized, or collected from adjacent locations for transplanting.

The proposed project also includes efforts to establish cottonwood growth on approximately 400 feet of damaged right bank upstream of existing Bridge 395. Existence of alkali soils along the eroding streambank make revegetation difficult. Cottonwood boles (20 to 30 feet long) with root wads will be placed in trenches dug through the alkali soils. The trenches will place the trees in contact with the underlying moist sands and gravels. Trenches will be dug at 20 to 30 foot intervals allowing the planting of approximately 16 trees. The trenches will be backfilled with quarry spalls and native material. To minimize damage to the trees, the cottonwoods will be removed and immediately placed into pre-dug trenches. Cutting and placement of the cottonwood boles and rootwads will take place in October or November. Silt fencing will be placed between the trench excavations and the adjacent flowing water.

1.2.7.3 Wetland Restoration

To minimize the effects of filling 0.12 acre of wetland, Yakima County will restore 0.2 acre of scrub-shrub wetland between existing the Bridges 396 and 397 by removing the abandoned roadway embankment. The wetland restoration site will be excavated/graded to obtain hydrological conditions necessary to support mixed emergent and scrub-shrub wetland plants.

1.2.7.4 Interrelated and Interdependent Actions

A power line parallel to the existing and future Donald Wapato Road alignment will be relocated in some areas to accommodate the new project alignment. The power company responsible for the power lines will undertake this activity. It is unlikely that this will require in-water work since the new bridges provide accommodations for utility lines. NOAA Fisheries anticipates that the potential affects of this activity on MCR steelhead are discountable.

1.3 Description of the Action Area

The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 C.F.R. 402.02).

The action area is defined as the stream channel which includes the water, and land (including submerged land) from approximately 1,700 feet upstream of the existing Donald Wapato Road Bridge to approximately 18,000 feet downstream from the new Donald Wapato Road Bridge. The action area also includes the adjacent riparian zone within the construction area and all staging areas, catch basins, and roadway approaches.

2.0 ENDANGERED SPECIES ACT

2.1 Biological Opinion

2.1.1 Status of Species

2.1.1.1 Middle Columbia River Steelhead

Middle Columbia River steelhead were listed as threatened under the ESA in 1999 (64 Fed. Reg. 14517; March 25, 1999). Steelhead of the Snake River Basin are not included in the MCR ESU.

All steelhead in the Columbia River Basin upstream from the Dalles Dam are summer-run, inland steelhead (Chapman *et al.* 1994). Sexually immature steelhead enter fresh water between May and October and their pre-spawning migration can last up to one year. In Washington, steelhead typically spawn between February and June (Busby *et al.* 1996). Depending on water temperature, steelhead eggs may incubate in redds for 1.5 to 4 months before hatching as alevins. Most MCR steelhead smolt at 2 years and spend 1 to 2 years in saltwater before re-entering freshwater. Steelhead require different habitat types during their life history. Spawning generally occurs in the gravel substrates of smaller streams and the side channels of larger rivers (Busby *et al.* 1994). Rearing juveniles utilize a variety of instream cover, including riffles, mid-channel pools, pocket water, overhanging vegetation, and large woody debris (LWD).

Estimates of historical, pre-1960s abundance for the Middle Columbia River ESU are only available for the Yakima River. The estimated pre-1960 run size is 100,000 (WDF *et al.* 1993). Using the assumption that other basins had comparable run sizes for their drainage areas, the total historical run size for this ESU may have been in excess of 300,000. The most recent five-year average run size (1989–1993) was 142,000 with a naturally produced component of 39,000. These data indicate that approximately 74 percent of returning adults in this ESU were of hatchery origin (Busby *et al.* 1996). Accordingly, the current natural run size for the ESU might be less than 15 percent of estimated historic levels.

The current distribution of Yakima Basin steelhead is much more restricted and spatially variable than it was historically. Current steelhead abundance is only about 1.3 to 6 percent of historical estimates, averaging 1,256 fish (range = 505 in 1996 to 2,840 in 1988) over brood years 1985–2000 (Berg 2001). Except for 1992, abundance has fluctuated around 1,000 fish since 1989 (*op. cit*.).

It is probable that the historical spawning distribution of summer steelhead included virtually all accessible portions of Yakima Basin, with highest spawning densities occurring in complex, multi-channel reaches of the mainstem Yakima and Naches rivers, and in third and fourth order tributaries with moderate gradients (Berg 2001).

While steelhead spawning has not been documented within the action area, the Wapato Reach, along with a downstream meander reach, appears to be the major winter-holding area for steelhead pre-spawners. Moreover, the entire lower Yakima is a major overwintering site for steelhead and juvenile spring chinook (Hockersmith *et. al.* 1995.).

2.1.1.1.1 Population Trends & Risks

For the MCR steelhead ESU as a whole, NOAA Fisheries estimates that the median population growth rate (lambda) over the base period ranges from 0.88 to 0.75, decreasing as the effectiveness of hatchery fish spawning in the wild increases compared to that of fish of wild origin (McClure *et al.* 2001). Furthermore, NOAA Fisheries has estimated the risk of absolute extinction for four of the spawning aggregations, using the same range of assumptions about the relative effectiveness of hatchery fish. At the low end, assuming that hatchery fish spawning in the wild have not reproduced (*i.e.*, hatchery effectiveness = 0), the risk of absolute extinction within 100 years ranges from zero for the Yakima River summer run to 1.00 for the Umatilla River and Deschutes River summer runs (McClure *et al.* 2001). Assuming that the hatchery fish spawning in the wild have been as productive as wild-origin fish (hatchery effectiveness = 100%), the risk of absolute extinction within 100 years ranges from zero for the Yakima River summer run to 1.00 for the Deschutes River summer run (McClure *et al.* 2001).

2.1.2 Evaluating the Proposed Action

The standards for determining jeopardy are set forth in Section 7(a)(2) of the ESA as defined by 50 C.F.R. Part 402. The NOAA Fisheries must determine whether the action is likely to jeopardize the listed species. This analysis involves the initial steps of defining the biological requirements of the listed species, and evaluating the relevance of the environmental baseline to the species' current status.

Subsequently, NOAA Fisheries evaluates whether the action is likely to jeopardize the listed species by determining if the species can be expected to survive with an adequate potential for recovery. In making this determination, NOAA Fisheries must consider the estimated level of mortality attributed to the collective effects of the proposed or continuing action, the environmental baseline, and any cumulative effects. This evaluation must take into account measures for survival and recovery specific to the listed salmon's life stages that occur beyond the action area.

2.1.2.1 Biological Requirements

The relevant biological requirements are those necessary for MCR steelhead to survive and recover to naturally reproducing population levels at which time protection under the ESA would become unnecessary. Adequate population levels must safeguard the genetic diversity of the listed stock, enhance their capacity to adapt to various environmental conditions, and allow them to become self-sustaining in the natural environment.

Biological requirements are defined as properly functioning conditions (PFC) of habitat conditions that are relevant to any steelhead life stage. These habitat conditions include all parameters of the matrix of pathways and indicators described in NOAA Fisheries (1996). Information related to biological requirements for MCR steelhead can be found in Busby *et al.* (1996). Presently, the biological requirements of listed species are not being met under the environmental baseline. The specific biological requirements affected by the proposed action include water quality (*i.e.* sediment/turbidity) and riparian reserves.

2.1.2.2 Environmental Baseline

The environmental baseline represents the current set of basal conditions to which the effects of the proposed action are then added. Environmental baseline is defined as "the past and present impacts of all Federal, State, and private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or informal section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation process" (50 C.F.R. 402.02). The term "action area" is defined as "all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action."

The Yakima River drains an area of 6,155 square miles and contains about 1,900 river miles of perennial streams. Originating near the crest of the Cascade Range above Keechelus Lake, the Yakima River flows 214 miles southeastward to its confluence with the Columbia at river mile 335.2. The Yakima River Basin lies within areas either ceded to the United States by the Yakama Indian Nation or areas reserved for the use of the Yakama Indian Nation. The Yakama Reservation occupies about 15 percent of the basin (Ecology 1998). Land use in the basin is dominated by irrigated agriculture, cattle grazing, timber harvest, and recreation (*op. cit.*). In the project vicinity, much of the land is used for agriculture. An automobile salvage yard is located adjacent to the side channel at the west end of existing Bridge 396.

At the project site, the 100-year floodplain is more than 9,000 feet wide, extending from near the Interstate 82 interchange to the railroad grade just east of the City of Wapato. During storm events, a series of long and narrow channels, shallow backwaters, and wetlands provide natural flood storage. Stream habitats within the action are relatively complex and include a mix of riffles, runs, and pools. The streambed substrate consists mainly of gravel, with a few small boulders, many of which were placed for scour protection for the existing bridge. The streambanks of the main channel are steep, earthen slopes, with a five-to-ten-foot drop from the floodplain to the streambed. The river averages approximately 300 to 400 feet wide, with access to off-channel habitat dependent on the river elevation. The riparian habitat encompassed by the action area consists mainly of black cottonwood, wood rose, red-osier dogwood, and reed canarygrass, with bentgrass and Watson willowherb as the subdominant species. Localized bank instability has occurred upstream of the existing bridge as evidenced by the bank erosion caused by a river meander just upstream of Bridge 395. Yakima County has attempted to limit this erosion and provide bank protection by constructing two rock barbs and installing riprap on the upstream approach of existing Bridge 395.

2.1.2.3 Factors Affecting Species Environment within Action Area

The Yakima River watershed has experienced past disturbance in all areas, including considerable agriculture-related disturbances. The primary reasons for the decline of steelhead in the Yakima River include:

- construction of four dams on the Columbia River downstream of the Yakima River,
- widespread production of hatchery steelhead within this ESU,
- timber practices, degraded riparian and in-stream habitat from urbanization and livestock grazing,
- large irrigation withdrawals,
- poorly or totally unscreened irrigation diversions,
- low in-stream flows reducing rearing habitat and impeding fish passage,
- excessive water temperatures, and
- overfishing.

These conditions are greatly magnified in the lower Yakima River, creating unfavorable passage for upstream and downstream migrants as well as degraded rearing conditions for juveniles (WDFW 1992).

MCR steelhead have been negatively affected by a combination of habitat alteration and hatchery management practices. The four downstream dams on the Columbia are perhaps the most significant source of habitat degradation for this ESU. The dams act as a partial barrier to passage, kill out-migrating smolts in their turbines, raise temperatures throughout the river system, and have created lentic refugia for salmonid predators. In addition to dams, irrigation systems have had a major negative effect by diverting large quantities of water, stranding fish, and acting as barriers to passage. Other major habitat degradation has occurred through urbanization and livestock grazing practices (WDF *et al.* 1993; Busby *et al.* 1996; NOAA Fisheries 1996; 63 Fed. Reg. 11798, March 10, 1998).

Habitat alterations and differential habitat availability (*e.g.*, fluctuating discharge levels) impose an upper limit on the production of naturally spawning populations of salmon and steelhead. The National Research Council Committee (NRCC) on Protection and Management of Pacific Northwest Anadromous Salmonids identified habitat problems as a primary cause of declines in wild salmon runs (NRCC 1996). Some of the habitat effects identified were the fragmentation and loss of available spawning and rearing habitat, migration delays, degradation of water quality, removal of riparian vegetation, decline of habitat complexity, alteration of streamflows and streambank and channel morphology, alteration of ambient stream water temperatures, sedimentation, and loss of spawning gravel, pool habitat and large woody debris (NOAA Fisheries 1998, NRCC 1996, Bishop and Morgan 1996).

Hatchery management practices are suspected to be a major factor in the decline of this ESU. The genetic contribution of non-indigenous, hatchery stocks may have reduced the fitness of the locally adapted native fish through hybridization and associated reductions in genetic variation or introduction of deleterious (*i.e.*, non-adapted) genes. Hatchery fish can also directly displace natural spawning populations, compete for food resources, or engage in agonistic interactions (Campton and Johnston 1985; Waples 1991; NOAA Fisheries 1996; 63 Fed. Reg. 11798, March 10, 1998).

MCR steelhead population sizes are substantially lower than historic levels, and at least two extinctions are known to have occurred in the ESU. Prior to the 1960's, it is estimated that the Yakima River had annual run sizes of 100,000 fish, but in 1996 only 505 adults returned to the basin (WDF *et al.* 1993). The wild fish escapement across the entire ESU has averaged 39,000 and total escapement 142,000 (includes hatchery fish). The large proportion of hatchery fish, concurrent with the decline of wild fish, is a major risk to the MCR ESU (WDF *et al.* 1993; Busby *et al.* 1996; 63 Fed. Reg. 11798, March 10, 1998).

The lower Yakima River is seriously threatened by pollution. Various factors combine to affect water quality in the lower river. Contributing factors include eroded soil carried to the river via irrigation return or tributaries affected by irrigation runoff, sand and gravel mining, urban runoff, erosion from construction sites, road building, forestry practices, and natural causes (Ecology 1998). As a result, the lower Yakima River has been placed on the State's 303(d) list for impaired water bodies. The Washington Department of Ecology (Ecology) has determined that turbidity, DDT, DDE, mercury, pH, dissolved oxygen, instream flow, and temperatures represent key water quality impairments in the lower Yakima River.

Currently, the Wapato reach is confined on the left bank by riprapped revetments along Interstate 82, and on the right bank by earthen dikes. Where historically hundreds of channels meandered through miles of floodplain, now only one-to-three channels flow through a significantly constricted floodway. Flooding has been virtually eliminated in the Wapato reach except during very large events. This factor, in combination with others within and upstream of the reach, has resulted in elevated summer temperatures.

2.1.3 Effects of the Proposed Action

The proposed replacement of the Donald Wapato Road Bridges is likely to adversely affect MCR steelhead as determined by the FHWA. The segment of the Yakima River flowing through the action area provides major winter holding area for steelhead pre-spawners and is a major overwintering site for juvenile spring chinook and steelhead.

The ESA implementing regulations define "effects of the action" as "the direct and indirect effects of an action on the species together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline." Indirect effects are those that are caused by the proposed action, are later in time, but are still reasonably certain to occur (C.F.R. 402.02).

The proposed project would replace three existing bridges with two bridges that marginally improve channel dynamics, water flow, and floodplain connectivity. As such, the primary effects of the project are the direct effects of the construction activities required to replace the existing bridges.

2.1.3.1 Direct Effects

Direct effects result from the agency action and include the effects of interrelated and interdependent actions. Future Federal actions that are not direct effects of the action under consideration (and not included in the environmental baseline or treated as indirect effects) are not evaluated. The direct effects of the proposed bridge replacement project activities are discussed below.

2.1.3.1.1 Water Quality

Removal of the existing bridges, installation of new piers, and other activities associated with this project would mobilize sediments and temporarily increase downstream turbidity levels. In the immediate vicinity of the construction activities (several hundred feet), the level of turbidity would likely exceed ambient levels by a substantial margin and potentially affect MCR steelhead.

For salmonids, turbidity has been linked to a number of behavioral and physiological responses (*e.g.*, gill flaring, coughing, avoidance, increase in blood sugar levels) which indicate some level of stress (Bisson and Bilby 1982, Sigler *et al.* 1984, Berg and Northcote 1985, Servizi and Martens 1987). The magnitude of the stress responses is generally higher when turbidity is increased and particle size is decreased (Bisson and Bilby 1982, Servizi and Martens 1987, Gregory and Northcote 1993). Although turbidity may cause stress, Gregory and Northcote (1993) have shown that moderate levels of turbidity accelerate foraging rates among juvenile chinook salmon, likely because of reduced vulnerability to predators due to camouflaging.

When the particles causing turbidity settle out of the water column, they contribute to sediment on the riverbed (sedimentation). When sedimentation occurs, salmonids may be negatively impacted in the following ways: 1) salmonid eggs may be buried and suffocated; 2) prey habitat may be displaced; and 3) future spawning habitat may be displaced (Spence *et al.* 1996).

The proposed bridge replacement project will cause elevated turbidity levels during the construction (including demolition) period and for several days afterwards. However, the effects of this turbidity on MCR steelhead will be minimized by: 1) the installation of silt fences before construction begins, 2) the use of temporary sediment ponds, 3) the installation of a silt curtain prior to demolition of the old bridge spans, 4) scuttling the old bridge spans onto log rafts, and 5) constructing new bridge columns within cofferdams. It is also expected that MCR steelhead present during the initial phases of construction would temporarily move to refuges where turbidity can be avoided, thus preventing injury or death. Additionally, the project work window (*i.e.*, July 15 to September 30) will capitalize on a time of year when the fewest number of adult and juvenile MCR steelhead are present in the Wapato Reach and when there is the least amount of migratory movement by salmonids. Overall, the increased turbidity and sediment are not expected to influence the environmental baseline over the long term.

2.1.3.1.2 Streambed Disturbance

The removal of the old bridge piers and spans, and the installation of new bridge shaft foundations will disturb the substrate of the Yakima River. In-stream work may harm fish by homogenizing the substrate. Moreover, reducing the diversity of benthic habitat in the river will cause a temporal loss of macroinvertebrate habitat. Aquatic invertebrates serve as an important source of prey for salmonids, and the loss of aquatic invertebrate habitat may reduce foraging opportunities for listed salmonids. Effects associated with the disruption of the streambed are likely to be short-lived as invertebrates tend to rapidly recolonize disturbed areas (Allan 1995).

To minimize the disturbance of the river bed, the contractor will: 1) complete all in-water work during the previously described in-water work window, and 2) scuttle the exiting bridge spans onto log rafts.

NOAA Fisheries expects the that streambed disturbance caused by this action would be short lived, returning to baseline condition soon after construction is completed. Furthermore, NOAA Fisheries expects that long-term impacts would not occur. Other than the short-term impacts mentioned above, this project would not change or add to the existing baseline streambed condition within the lower Yakima River.

2.1.3.1.3 Fish Mortality from Bridge Demolition

Demolition of the bridges through the use of explosives and the percussive forces associated with impact of the scuttled bridge on the surface of the water could harm juvenile steelhead. Although the risk is considered low, the potential does exist for falling debris to injure or kill juvenile steelhead .

The County proposes to minimize the risk of harm to steelhead by implementing a fish exclusion plan in the immediate area of demolition beneath Bridges 396 and 397. This measure, however, may be only partially effective because the percussive forces of the explosives and the bridge impact on the water can be transmitted through the water for some distance. Moreover, excluding fish will not possible for Bridge 395 because the higher flows are ill suited for use of a silt curtain. However, the juvenile and young-of-the-year MCR steelhead present in the action area during the project work window should be able to evacuate the area when disturbance is initiated.

2.1.3.1.4 Pile Driving/Percussive Impacts

This project will include the installation of up to 150 steel pilings. To minimize effects the project will include timing restrictions, operation of the pile driving equipment in a prudent manner, and the use of hydroacoustic monitoring to determine sound levels.

The greatest potential impact from pile driving is from the underwater sound pressure waves that originate when an impact pile hammer contacts the top of a steel pile. The impact of the hammer on the top of the pile causes a wave to travel down the pile and causes the pile to resonate radially and longitudinally. Based on the known range of salmonid hearing, pile-driving noise would be expected to be heard by salmonids within 600 meters of the noise source, although salmon at this range may not exhibit any visible response (Feist *et al.* 1992). Impact pile driving can generate sound pressure levels in excess of 192 dB (re: 1 μPa), which is above the 180 dB (re: 1 μPa) shown to damage the inner ear of a non-salmonid fresh-water fish (Hastings *et al.* 1996).

Between 440 and 4,440 meters from an active pile driving operation, sound pressure levels are predicted to attenuate from 189 dB (re: 1 μPa) to approximately 150 dB (re: 1 μPa), respectively. Within this area, listed salmonids may exhibit temporary abnormal behavior indicative of stress or exhibit a startle response, but not sustain permanent harm or injury. However, there is some uncertainty about the potential for injury to fish from sound pressure levels in this range, because Hastings has information that suggests damage to the inner ear may occur at levels greater than 150 dB (re: 1 μPa). Hasting concludes that 150 dB (re: 1 μPa) is a safe upper limit for relatively short exposures (M. Hastings, 2001 as cited in NOAA Fisheries 2001).

Adverse effects from pile driving associated with the proposed action are expected to be minimal to MCR steelhead because of the timing restrictions imposed for this activity and due to the minimization measures to be used during pile driving. On-site monitoring will be conducted during the initial pile-driving operations to measure the overpressure readings and submit a report to the regulatory agencies. All instream pile-driving activities will be completed during the instream work window. Vibratory hammers will be used for temporary piling removal and driving of any opened pile when ever possible. If problems occur maintaining overpressures less than 100 kPa, the contractor will try to reduce overpressure by installing a steel pipe cofferdam around the pile being driven.

2.1.3.1.5 Population Trends and Risks

The proposed action will have short-term (construction-related) adverse affects on water quality, in-stream habitat, and riparian reserves. In the long term, however, the project will result in incremental, beneficial affects on floodplain connectivity and in-stream habitat. Additionally, the timing and duration of in-stream work activities will minimize the affects on MCR steelhead. Therefore, the proposed action is unlikely to influence the pre-project lambda estimates.

2.1.3.2 Indirect Effects

Indirect effects are caused by or result from the proposed action, are later in time, and are reasonably certain to occur (50 C.F.R. 402.02). Indirect effects can occur outside of the area directly affected by the action. Indirect effects can include other Federal actions that have not undergone Section 7 consultation but will result from the action under consideration. These actions must be reasonably certain to occur, or they are a logical extension of the proposed action. The indirect effects of the Donald Wapato Road Bridge replacement project are discussed below.

2.1.3.2.1 Predation & Over-water Structures

Predation by smallmouth bass, largemouth bass, and possibly other species might increase as a result of the construction of the new bridges and the temporary work bridges. The new bridges will create approximately 13,000 square feet more over-water area than the three existing bridges, and the work bridges will temporarily create approximately 36,000 square feet of over-water structure. While NOAA Fisheries is unaware of any studies which have been done to specifically determine impacts of in/over-water structures on salmon, there are numerous predation studies which suggest that there likely is a serious predation impact from these structures (Carrasquero 2001). The proposed structures will be located in an area of the Yakima River where MCR steelhead migrate and rear and where predators are present.

However, the project will also result in the connection of a large side channel, which has been disconnected since at least the early part of the Twentieth Century. This side channel is currently a low velocity channel, which is filling with organic mucks and supports non-native fish species. Restoring this connection should increase habitat for native species, especially salmon and trout, and decrease habitat for non-native fishes.

When taken as a whole, NOAA Fisheries believes the scientific literature relating to predator/prey behavior indicates that the addition of in/over-water structures likely increases predator success under certain conditions. While those conditions exist at the site of the proposed bridge replacement project, other aspects of the project will lead to a reduction of habitat favored by predators. Consequently, NOAA Fisheries expects that there will be no measurable, long-term increase in the rate of predation as a result of the project.

2.1.3.2.2 Loss of Functional Streambed Habitat

Approximately 200 square feet of streambed habitat will be permanently lost from the construction of new bridge columns. In addition, approximately 2000 square feet of streambed will be temporarily disturbed during the removal of the existing bridges and the installation and subsequent removal of cofferdams and steel piles.

To minimize the loss of streambed habitat function, the County will restore approximately 400 square feet of streambed habitat by removing bridge piers associated with the current Donald Wapato Bridge and in the old alignment (in the left channel) located approximately 200 feet downstream of the current Donald Wapato Bridge.

2.1.3.2.3 Loss of Functional Riparian Habitat

Clearing of riparian vegetation on the island are expected to negatively affect the function of riparian habitat. Riparian zones provide numerous functions essential to the maintenance of habitat conditions conducive to salmon survival. Riparian and floodplain zones provide a variety of important hydrologic functions, such as groundwater recharge, baseflow maintenance, and floodwater detention. Riparian vegetation limits the rate of erosion and sediment delivery, and provides thermal moderation. Riparian vegetation provides a source of LWD and bank stability that is vital in creating and maintaining channel complexity, sediment storage sites, large pools, and cover.

Stream-side vegetation contributes to channel stability through root strength and channel roughness and its loss can lead to bank collapse. Riparian trees within one tree height of channel margins are a direct source of LWD to fish habitat. Additional LWD may be recruited to the stream as channels meander across the floodplain, capturing LWD that was previously in the dry. LWD contributes to the formation of large pools, channel complexity, and cover. Riparian vegetation typically contributes to stream shading, and thereby reduces stream temperatures.

Most of the area proposed for clearing has the potential to contribute LWD to the river in the short- or long-term. Much of the mature cottonwood forest to be cleared is within one tree height of the current banks and therefore is a direct source of shading and LWD to the channel. Much of the remainder of the proposed clearing area could be within one tree height in the foreseeable future, given the propensity of the Yakima river to migrate laterally at this site, in spite of the engineered constrictions in place. The likelihood of the river migrating laterally will be increased by the proposed action, as clearing vegetation near the streambanks will decrease bank stability, increasing the susceptibility to erosion.

Soil compaction in riparian and floodplain zones may alter hydrologic functions, such as bank storage and groundwater recharge (Gardner and Chong 1990). Compaction may decrease soil conductivity, soil porosity, and infiltration rates. This can reduce recharge of groundwater, leading to reduced baseflow inputs during low flow periods. In the lower Yakima system, a reduction in relatively cool summer base-flow inputs from groundwater would be expected to both reduce discharge and increase temperature.

To minimize the loss of riparian habitat function, the County will: 1) replant 5 acres of disturbed area with approximately 6000 shrubs and 530 trees, 2) establish cottonwood growth on approximately 400 feet Yakima River bank, and 3) distribute salvaged cottonwood boles in riparian areas upon the completion of construction.

2.1.3.2.4 Floodplain Connectivity

The hydraulic capacity of the new Bridge 396 opening will be enhanced as a result of both the increased overall bridge length and the elimination of abutments between existing Bridges 396 and 397. In addition, the removal of bridge abutments will have a significant beneficial affect on the hydraulic efficiency of the bridge opening by decreasing the hydraulic radii of two existing channels to one post-project channel. This increase in efficiency across the entire road crossing will be most noticeable at high flow levels (*i.e.*, bankfull and above). Additionally, by increasing the length of Bridge 396 from 246 to 415 feet, the hydraulic capacity of the left channel will be greatly increased. Hydraulic-modeling analyses conducted by Yakima County indicate that proposed activities will decrease the 100-year flood stage upstream of the road crossing by approximately 0.71 feet, primarily because streamflow is more evenly spread across the floodplain. Further, this action will help to reconnect an extensive side channel along the left (north) bank of the river that has been disconnected since the early part of the 20th century because of iterative floodplain development actions (*e.g.*, levees, roadways). Flow in this side channel is predominately low velocity, controlled largely by the abutments and openings of Bridges 396 and 397 and the backwater affect of the entire road prism. The magnitude and frequency of channel-forming streamflows through this side channel has largely been reduced, especially as the Yakima River migrated southward during a high flow event in February 1996. Consequently, in response to this flood event and others of smaller magnitude, this side channel has aggraded with finely-grained sediments, creating habitat better suited for non-native fishes, including species that prey on juvenile salmonids. Increasing the hydraulic capacity of the Yakima River along the left side of the floodplain in the action area will promote the reconnection of this historic side channel and its adjacent riparian habitat, and should increase habitat for native species assemblages. Finally, the proposed action will help promote more natural floodwater passage through the roadway, thus helping to eliminate the need for future emergency flood-management activities that can be deleterious to native aquatic species.

Removal of the old bridge embankments down to natural surrounding ground elevations will increase potential floodplain storage areas, improve hydraulic-opening efficiency to the new bridges (located just downstream), and permit reestablishment of native riparian vegetation. Over time, as the Yakima River adjusts to the altered hydraulic conditions across the project area, reclaimed road embankment areas will likely become active floodplain and, consequently, provide a range of important ecological functions.

The removal of an existing gravel dike on the left bank just upstream of Bridge 396 will increase channel efficiency, promote the lateral migration of the Yakima River, and increase interactions between the river and its floodplain. In response to a flood event in February 1996, this dike (and the cross-floodplain road prism just downstream) impounded water across a large area of the floodplain. These floodwaters had no drainage path back to the river and likely promoted the stranding and eventual death of any fish that became isolated after floodwaters receded. Removal of this dike will significantly reduce the risk of fish standings, improve floodplain function, and promote the growth of native riparian plant communities that are driven by frequent over-bank flooding. This action, in combination with removing the existing roadway embankments, should promote more natural adjustments between the Yakima River and its adjacent floodplain by encouraging the river to reside in the historic side channel along the left bank. Under present conditions, the Yakima River has tended toward the south (right) bank of the river, carving a deep channel and largely pulling the water table to one half of the floodplain. Over time, these adjustments will positively affect in-stream habitat and riparian vegetation as the river returns to a more natural profile.

In summary, the project will result in the removal of several areas of fill from the floodplain of the Yakima River, including the abutments between Bridges 396 and 397, a dike on left bank just upstream of Bridge 396, and old bridge embankments. Modeling indicates that increasing bridge openings, and removing the embankment between the bridges and an upstream dike will result in a 0.71-foot decrease in the 100-year water surface at the existing bridge and along the new roadway. Although there will be a small decrease in the areal extent of upstream floodplain inundated during a 100-year event, floodwaters will have access to previously protected areas along the left bank of the river underlain by porous alluvium and covered by fairly healthy native riparian vegetation. Under present conditions, floodwaters tend toward the right side of the floodplain, and, dammed by the existing roadway, inundate a barren tract of land that supports invasive plant species growing in finely-grained soils that limit infiltration into the underlying alluvial aquifer. Additionally, the proposed action will help to reconnect the Yakima River with a side channel that was previously accessible only at extremely high flows. Hence, the proposed project will result in a net improvement in the environmental baseline for floodplain connectivity within the action area.

2.1.3.2.5 Filling of Wetlands

The access driveway from the new alignment to the auto salvage yard will result in the filling of 0.12 acre of scrub-shrub wetland. Wetlands provide many important functions including water-quality improvement, groundwater recharge, flood desynchronization, stream base-flow augmentation, and food-chain support (Hruby *et al.* 1999, 2000; Mitsch and Gosselink 2000; Null *et al.* 2000), which can make a significant contribution toward the proper functioning of stream systems. To minimize the affects of the lost wetland functions, Yakima County will restore 0.2 acre of scrub-shrub wetland between the existing 396 and 397 bridges by removing the abandoned roadway embankment. The created wetland area will be graded to contours found in adjacent wetland areas and planted with native shrubs and emergent wetland plant species.

2.1.3.2.6 Impervious Surface & Stormwater Facilities

There are several adverse effects associated with adding impervious surface such as roads to a watershed. Those adverse effects are described in further detail below. The extent to which steelhead experience adverse effects associated with impervious surfaces depends on several factors. Impervious surfaces can affect steelhead by degrading water quality, water temperature, and/or hydrology of stream habitat. Stormwater treatment facilities and other techniques can reduce the adverse effects of those changes if they are incorporated into the project.

Impervious surfaces affect the watershed in several ways. The addition of impervious surface will result in increased stormwater runoff and alteration of existing drainage patterns in the action area. Such effects to hydrology typically include increased frequency and duration of peak flows and the presence of peak flows during periods when none previously existed. Increased impervious area also can shift the hydrologic regime from subsurface to surface runoff and may result in higher and more frequent peak flows even with small storms. Increased peak flows and increased frequency and duration of peak flows can adversely alter steelhead habitat through lateral erosion, bed scour, downcutting, bank de-stabilization, and removal of woody debris. In addition, increasing peak flows reduces groundwater recharge which in turn decreases base flows. Decreased base flows may create migration barriers, strand fish in disconnected habitats, and increase stream temperatures.

Research indicates a negative relationship between impervious surface and water quality associated with stormwater runoff (Schueler 1984). In urban areas, roads act as conduits of stormwater runoff and pollutants from impervious areas directly to streams. May *et al*. (1997) discussed declines in biological integrity and habitat quantity and quality as the level of impervious surface area increased above five percent. Large rainstorms and subsequent high flows can elevate total suspended solids, turbidity, and nutrient concentrations in urban watersheds. Additionally, chemical water quality generally declines as urbanization increases (May *et al*. 1997). Increased impervious surface also contributes to water temperature increases in streams (Schueler 1984). The addition of impervious surface to the watershed, including riparian areas, will also result in a permanent loss of opportunity for revegetation in the areas where those surfaces are added.

The proposed road project will increase the impervious surface area within the action area by approximately 1.9 acres. The proposed project will avoid or minimize adverse changes in hydrology by creating stormwater treatment facilities designed to treat the runoff generated from the bridge replacement project. Stormwater will be collected from the bridges and approach surfaces and conveyed to infiltration ponds located on each end of the project. Detention basins will infiltrate treated stormwater, and, consequently, will minimize the adverse affects on instream flows more than detention alone.

The Lower Yakima River basin has a relatively low-density road network and the bridge replacement will not increase the road network in the watershed. The proposed project will add impervious surface to the action area, but the proposed stormwater treatment facility will appropriately minimize the effects of stormwater resulting from the proposed project.

2.1.4 Cumulative Effects

Cumulative effects are defined as "those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the federal action subject to consultation" (50 C.F.R. 402.02).

Cumulative effects to steelhead from the foreseeable future state and local activities affecting the Yakima River and its shoreline area are anticipated to be limited. No other projects near the proposed site are known to be scheduled during the same time period.

The project is not likely to induce development in the immediate project area. Portions of the project area south toward Wapato from the east bank of the Yakima River include Tribal Trust Land administered by the Bureau of Indian Affairs. The land to the north is located within Yakima County, which has adopted the following land use designations:

- *Remote/Extremely Limited Development Potential (R/ELDP)*.— The County land comprised primarily of floodplain and riparian area is designated as R/ELDP.

- *Valley Rural (VR)*.— A long strip of land adjacent to Interstate 82 is designated as VR.
- *Agricultural (AG)*.— Most of the property northeast of Interstate 82 is designated as AG.

Subsequent residential or commercial development with the shoreline zone near the project is not anticipated due to regulatory constraints. In addition, the proposed bridge replacement is not designed to facilitate access to developable areas. Accordingly, the project has not been designed to accommodate future development in the project area and none is believed to be feasible.

A recent bridge replacement project was completed by Yakima County at the Parker Bridge site about four miles upstream from the Donald Wapato Bridge. The County intends to replace the North Myers Road Bridge after the Donald Wapato Bridge is completed, but does not intend for the construction of the bridges to overlap.

2.1.5 Conclusion

The proposed action is not likely to jeopardize the continued existence of MCR steelhead. There will be short-term direct impacts associated with the proposed activities. Demolition and construction activities will result in temporary increases of sediment and turbidity levels. However, potential adverse effects will be minimized through the use of Best Management Practices in the design and construction. The bridge replacement will increase the amount of over-water structure above the Yakima River. Overall, the proposed activities are not expected to appreciably reduce the likelihood of survival and recovery of MCR steelhead. The determination of no jeopardy was based on the following factors: 1) timing restrictions related to in-water construction will minimize impacts to fish and their habitat, 2) removal of the old bridge abutments and a flood control dike will improve passage conditions for all life stages of salmonids and will improve channel morphology, 3) the installation of stormwater facilities will minimize the effects of increased impervious surface added to the Yakima watershed, and 4) riparian vegetation removal will be minimized and replaced. NOAA Fisheries concludes that the proposed action is not likely to impair properly functioning habitat or appreciably reduce the functioning of already impacted habitat. Furthermore, NOAA Fisheries concludes that the proposed action is unlikely to influence existing population trends or risks in the action area. Overall, the proposed activities are not expected to appreciably reduce the likelihood of survival of MCR steelhead.

2.1.6 Reinitiation of Consultation

Consultation must be reinitiated if the extent of taking specified in the Incidental Take Statement is exceeded, or is expected to be exceeded; new information reveals effects of the action may affect listed species in a way not previously considered; the action is modified in a way that causes an effect on listed species that was not previously considered; or, a new species is listed or critical habitat is designated that may be affected by the action (50 C.F.R. 402.16).

2.2 Incidental Take Statement

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species without special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Harm is further defined as significant habitat modification or degradation that results in death or injury to listed species by "significantly impairing behavioral patterns such as breeding, spawning, rearing, migrating, feeding, and sheltering" (50 C.F.R. 222.102). Incidental take is take of listed animal species that results from, but is not the purpose of, the Federal agency or the applicant carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to, and not intended as part of, the agency action is not considered prohibited taking provided that such takings is in compliance with the terms and conditions of this incidental take statement.

An incidental take statement specifies the effects of any incidental taking of endangered or threatened species. It also provides reasonable and prudent measures that are necessary to minimize take and sets forth terms and conditions with which the action agency must comply to implement the reasonable and prudent measures.

2.2.1 Amount or Extent of Take Anticipated

The proposed action is reasonably certain to result in incidental take through harm and harassment of juvenile steelhead. The exact numerical extent of take is difficult to determine, and therefore has not been quantified. Instead, the extent of effects on habitat in the action area have been analyzed and Reasonable and Prudent Measures have been developed to minimize the extent of those effects. The mechanisms of take that are reasonably certain to occur during project activities include work in the water, isolation of in-water work areas, temporary construction effects including sediment mobilization, vegetation removal, and hydrologic changes related to increased impervious surface. The extent of take that is anticipated to result from activities associated with the Donald Wapato Road Bridge replacement project are summarized below.

- The clearing of approximately 1,800 feet of streambank will result in increased delivery of fine sediments and could result in elevated water temperature. Moreover, increased turbidity will result from several in-water construction activities, including the driving and subsequent removal of both cofferdams and steel piles, the demolition of the existing bridges, and the removal of the railroad bridge piers. Based on information presented in a study of the Yakima River Total Maximum Daily Load (Joy and Patterson 1997), the distance for colloidal materials to settle out is 18,000 feet if the Roza Waste Way No. 3 is not in operation, or approximately 8,900 feet if the wasteway is in operation.
- A net increase of 1.9 acres of new impervious surface could result in the degradation of water quality in the Yakima River.
- Approximately 200 square feet of streambed habitat will be permanently lost from the construction of new bridge columns. In addition, approximately 2000 square feet of

streambed will be temporarily disturbed during the removal of the existing bridges and the installation and subsequent removal of cofferdams and steel piles.
- The demolition of the existing bridges could result in the injury or death of MCR steelhead that remain in the work area.
- Pile driving will generate noise levels that could harm MCR steelhead that remain in the work area. Pile driving will last approximately four weeks.
- A permanent net increase of 3,600 square feet and a temporary increase of approximately 13,000 square feet of over-water structure could lead to increased predation of MCR steelhead.
- The clearing of about 4.7 acres of riparian habitat, cutting of up to 40 cottonwood trees, and filling of 0.12 scrub-shrub wetland will result in the further short-term degradation of the riparian reserves baseline indicator.

2.2.2 Reasonable and Prudent Measures

The NOAA Fisheries believes that the following reasonable and prudent measures (RPM) are necessary and appropriate to minimize incidental take of MCR steelhead:

1. The action agency will minimize the amount and extent of incidental take from construction activities by taking measures to limit the timing, duration, and extent of construction within the OHWM.

2. The action agency will minimize the amount and extent of incidental take from isolation and fish handling by taking measures that ensure prudent methods are used that will minimize risk of injury to listed species.

3. The action agency will minimize the amount and extent of incidental take from construction activities in or near the Yakima River, by developing and implementing effective erosion and pollution control measures throughout the area of disturbance and for the life of the project. The measures shall minimize the movement of soils and sediments both into and within the Yakima River, and stabilize bare soil over both the short and long term.

5. The action agency will minimize the amount and extent of take from loss of instream habitat, by taking measures to minimize impacts to riparian and instream habitat, or where impacts are unavoidable, to replace or restore lost riparian and instream function.

6. The action agency will ensure the effectiveness of implementation of the RPMs, the erosion control measures, and plantings for site restoration by monitoring and evaluating both during and following construction, and meet criteria as described below in the terms and conditions.

2.2.3 Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the FHWA must ensure that Yakima County complies with the following terms and conditions, which implement the

RPMs described above. Implementation of the terms and conditions within this Opinion will further reduce the risk of impacts to MCR steelhead. These terms and conditions are non-discretionary.

1. To implement RPM No. 1 (construction within the OHWM) above, the FHWA shall ensure that:

    1.1 All work within the active channel of the Yakima River is completed between July 15 and September 30. Any additional extensions of the in-water work period are first approved by and coordinated with NOAA Fisheries and WDFW.

    1.2 Planned alteration or disturbance of streambanks and existing riparian vegetation are minimized to the extent described in the BA.

    1.3 All water intakes used for the project, including pumps used at in-water work areas, are screened and maintained according to NOAA Fisheries' fish screen criteria.[1]

    1.4 The existing bridge spans to be dropped onto log rafts (or an equivalent structure) to minimize water quality impacts and damage to the streambed.

    1.5 Steel pile driving will take place in the dry, if possible. If steel piles are used, hydroacoustic monitoring shall take place. The hydroacoustic monitoring will include the following elements:
    1) Underwater sound levels monitored at 3 meters depth and 10 meter distance from the pile driving site. If hydroacoustic monitoring from the first five piles do not indicate sound levels exceeding 150 dB (re: 1 μPa) at three meters depth and 10 meters distance from the pile, no additional hydroacoustic monitoring is needed as pile driving continues. The energy to drive the first five piles shall be representative of the maximum energy used on the subsequent piles. If levels exceed 150 dB (re: 1 μPa) 50% of the time or less but does not exceed 180 dB (re: 1 μPa) during the first five piles, pile driving may continue along with continued hydroacoustic monitoring or, at Yakima County's option, pile driving may continue without hydroacoustic monitoring with the use of an appropriate sound attenuation minimization measure as discussed below. If levels exceeded 150 dB (re: 1 μPa) more than 50% of the time or exceeded 180 dB (re: 1 μPa) during the first five piles, pile driving may only continue with the use of an appropriate sound attenuation minimization measure as discussed below. The Yakima County's will notify the FHWA and NOAA Fisheries of the hydroacoustic monitoring from the first five piles within 72 hours.
    2) Based on the outcome of the above described hydroacoustic monitoring, an appropriate sound attenuation minimization measure, such as one of the following,

[1] NOAA Fisheries, Juvenile Fish Screen Criteria (revised February 16, 1995) and Addendum: Juvenile Fish Screen Criteria for Pump Intakes (May 9, 1996) (guidelines and criteria for migrant fish passage facilities, and new pump intakes and existing inadequate pump intake screens) (http://www.nwr.noaa.gov/1hydrop/hydroweb/ferc.htm).

shall be employed. Methods to minimize the underwater sound pressure level may include reducing the force of each strike, or attenuating the underwater sound by enclosing the pile in a pile sleeve.
3) A report will be submitted to the FHWA and NOAA Fisheries within 30 days of completion of the project that presents the results of the hydroacoustic monitoring conducted during the project. The following data will be provided in the report: size and type of pile; approximate energy supplied to the pile; frequency and amplitude of the underwater sound; angle of the pile; water depth, distance from shore or bulkhead; and type and depth of substrate.

2. To implement RPM No. 2 (isolation and fish handling), the FHWA shall ensure that

   2.1 The work area is isolated from the flowing stream using the measures described in the BA and which are incorporated here by reference.

   2.2 A fishery biologist experienced with work-area isolation ensures the safe handling of all ESA-listed fish and conducts or supervises the entire capture and release operation.

   2.3 The capture team handles ESA-listed fish with extreme care, keeping fish in water to the maximum extent possible during capture and transfer procedures to prevent the added stress of out-of-water handling.

   2.4 Captured fish are released as near as possible to the capture area.

   2.5 ESA-listed fish are not transferred to anyone except NOAA Fisheries personnel, unless otherwise approved in writing by NOAA Fisheries.

   2.6 Other Federal, state, and local permits necessary to conduct the capture and release activity are obtained.

   2.7 NOAA Fisheries or its designated representative is allowed to accompany the capture team during the capture and release activity, and must be allowed to inspect the capture team's capture and release records and facilities.

   2.8 The capture team completes the In-water Construction Monitoring Report form (Appendix 1) for all salmonids encountered during isolation and fish-movement operations. The FHWA submits to NOAA Fisheries (Washington Branch) a monitoring report with the results of the monitoring by December 31 of the year following the completion of construction.

3. To implement RPM No. 3 (construction activities), the FHWA shall ensure that all temporary erosion and sediment control (TESC) and pollution control measures included in the BA are included as special provisions in the contract. NOAA Fisheries requires the

FHWA to pay particular attention to preparation of a TESC plan as follows: A TESC plan will be prepared by the FHWA, Yakima County, or the Contractor and implemented by the Contractor. The TESC plan will outline how and to what specifications various erosion control devices will be installed to meet water quality standards, and will provide a specific inspection protocol and time response. Erosion control measures shall be sufficient to ensure compliance with applicable water quality standards and this Opinion. The TESC plan shall be maintained on site and shall be available for review upon request. FHWA shall also ensure that:

3.1 Construction within the project vicinity does not begin until all temporary erosion controls are in place. Erosion control structures are maintained throughout the life of the contract.

3.2 All exposed areas are replanted with a native seed mix.

3.3 All equipment used for in-water work is cleaned prior to entering the active channel of the Yakima River. External oil and grease will be removed. Untreated wash and rinse water is not discharged into streams and rivers without adequate treatment.

3.4 Material removed during excavation is only placed in upland locations and shall be prevented from eroding into the Yakima River.

3.5 Any material that falls into the Yakima River during construction operations is removed in a manner that has a minimum impact on the streambed and water quality.

3.6 The Contractor develops an adequate, site-specific Spill Prevention and Countermeasure or Pollution Control Plan (PCP), and is responsible for containment and removal of any toxicants released. FHWA will monitor the Contractor to ensure compliance with this PCP.

3.7 Areas for fuel storage, refueling, and servicing of construction equipment and vehicles are at least 150 feet from the stream channel and all machinery fueling and maintenance occurs within a contained area. Overnight storage of vehicles and equipment occurs only in designated staging areas.

3.8 No surface application of nitrogen fertilizer is used within 50 feet of any water of the state of Washington.

4. To implement RPM No. 4 (riparian habitat protection), the FHWA shall ensure that:

   4.1 Abandoned road embankments, bridge piers, and bridge abutments are removed.

   4.2 The 730-foot-long dike on the left bank, upstream of the existing bridge, is removed.

4.3 Approximately 5 acres of disturbed area is planted with a native seed mix, and 5800 native shrubs and 530 native trees as described in the BA.

4.4 All planted cottonwoods are irrigated weekly through the first summer after planting.

4.4 The boles of all felled cottonwood trees (≥8 dbh) are salvaged and used in the establishing cottonwood growth on the right bank, and/or distributed in riparian areas.

5. To implement RPM No. 5 (monitoring), the FHWA shall ensure that:

   5.1 Erosion control measures as described above in RPM No. 2 are monitored.

   5.2 All riparian plantings are monitored yearly for three years to ensure that finished grade slopes are at stable angles of repose and that woody plantings are achieving a minimum of 80 percent cumulative survival.

   5.3 If the success standard specified above in RMP No. 5.2 is not achieved, dead plantings are replaced to bring the site into conformance. If failed plantings are deemed unlikely to succeed, replacement plantings are conducted at other appropriate locations in the project area.

   5.4 By December 31 of the year following the completion of construction, the FHWA submits to NOAA Fisheries (Washington Branch) a monitoring report with the results of the monitoring required in terms and conditions 5.1 and 5.2 above.

   5.6 In each of the two years following completion of construction, the FHWA submits to NOAA Fisheries (Washington Branch) a monitoring report with the results of monitoring requirements of 5.3 and 5.4 above.

3.0 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

3.1 Background

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance EFH for those species regulated under a Federal fisheries management plan. Pursuant to the MSA:

- Federal agencies must consult with NOAA Fisheries on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH (§305(b)(2));

- NOAA Fisheries must provide conservation recommendations for any Federal or State activity that may adversely affect EFH (§305(b)(4)(A));
- Federal agencies must provide a detailed response in writing to NOAA Fisheries within 30 days after receiving EFH conservation recommendations. The response must include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the conservation recommendations of NOAA Fisheries, the Federal agency must explain its reasons for not following the recommendations (§305(b)(4)(B)).

EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA §3). For the purpose of interpreting this definition of EFH: Waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (50 C.F.R. 600.110). Adverse effect means any impact which reduces quality and/or quantity of EFH, and may include direct (*e.g.*, contamination or physical disruption), indirect (*e.g.*, loss of prey or reduction in species fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 C.F.R. 600.810).

EFH consultation with NOAA Fisheries is required regarding any Federal agency action that may adversely affect EFH, including actions that occur outside EFH, such as certain upstream and upslope activities.

The objectives of this EFH consultation are to determine whether the proposed action would adversely affect designated EFH and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse effects to EFH.

3.2 Identification of EFH

Pursuant to the MSA the Pacific Fisheries Management Council (PFMC) has designated EFH for three species of federally managed Pacific salmon: chinook; coho, and Puget Sound pink salmon (*O. gorbuscha*) (PFMC 1999). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other water bodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the PFMC 1999), and longstanding, naturally impassable barriers (*i.e.*, natural waterfalls in existence for several hundred years). Detailed descriptions and identifications of EFH for salmon are found in Appendix A to Amendment 14 to the Pacific Coast Salmon Plan (PFMC 1999). Assessment of potential adverse effects to these species' EFH from the proposed action is based, in part, on this information.

3.3 Proposed Actions

The proposed action and action area are detailed above in Sections 1.3 and 1.4 of this document. The action area includes habitats that have been designated as EFH for various life-history stages of chinook and coho salmon.

3.4 Effects of Proposed Actions

As described in detail in Section 2.1.3 of this document, the proposed action may result in detrimental short- and long-term impacts to a variety of habitat parameters. These adverse effects are:

1. Short-term degradation of water quality in the action area due to an increase in turbidity and contaminants during in-water construction.

2. Short-term degradation of habitat due to removal of riparian vegetation.

3. Short-term degradation of habitat resulting from the clearing of riparian vegetation and both the scuttling of the existing bridge spans and construction of new bridge piers in the Yakima River.

3.5 Conclusion

NOAA Fisheries believes that the proposed actions may adversely affect EFH for chinook and coho salmon.

3.6 EFH Conservation Recommendations

Pursuant to Section 305(b)(4)(A) of the MSA, NOAA Fisheries is required to provide EFH conservation recommendations to Federal agencies regarding actions that would adversely affect EFH. While NOAA Fisheries understands that the conservation measures described in the BA will be implemented by the Yakima County, it does not believe that these measures are sufficient to address the adverse impacts to EFH described above. Consequently, NOAA Fisheries recommends that Yakima County implement the following conservation measures to minimize the potential adverse effects to EFH for chinook and coho salmon:

1. Adopt Term and Condition 1.3, as described in Section 2.2.3, to minimize EFH adverse to minimize EFH adverse affects No. 1.
2. Adopt Terms and Conditions 3.1 through 3.8, as described in Section 2.2.3, to minimize EFH adverse affects No. 2.
3. Adopt Terms and Conditions 4.1, 4.2, and 5.1 through 5.3 as described in Section 2.2.3, to minimize EFH adverse affects No. 3.

3.7 Statutory Response Requirement

Pursuant to the MSA (§305(b)(4)(B)) and 50 C.F.R. 600.920(j), Federal agencies are required to provide a detailed written response to NOAA Fisheries' EFH conservation recommendations within 30 days of receipt of these recommendations. The response must include a description of measures proposed to avoid, mitigate, or offset the adverse impacts of the activity on EFH. In the case of a response that is inconsistent with the EFH conservation recommendations, the response must explain the reasons for not following the recommendations, including the scientific justification for any disagreements over the anticipated effects of the proposed action and the measures needed to avoid, minimize, mitigate, or offset such effects.

3.8 Supplemental Consultation

The FHWA must reinitiate EFH consultation with NOAA Fisheries if the proposed action is substantially revised in a manner that may adversely affect EFH, or if new information becomes available that affects the basis for NOAA Fisheries' EFH conservation recommendations (50 C.F.R. 600.920(k)).

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APPENDIX I
In-Water Construction Monitoring Report

In-Water Construction Monitoring Report
Donald Wapato Road Bridge Replacement (NOAA Fisheries WSB-02-002)

Start Date: _______________
End Date: _______________

Waterway: Yakima River, Yakima County

Construction Activities:

____
____
____
____
____
_____

Number of fish observed: ___________
Number of salmonid juveniles observed (what kind?):
____
Number of salmonid adults observed (what kind?):
____

What were fish observed doing prior to construction?__________________________________
____
____
__

What did the fish do during and after construction?
____
____
____
____
___

Number of fish stranded as a result of this activity: __________

How long were the fish stranded before they were captured and released to flowing water?
____
____
____
___

Number of fish that were killed during this activity: __________

Send report to:
National Marine Fisheries Service, Washington State Habitat Branch, 510 Desmond Dr. SE, Suite 103, Lacey, WA 98503